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ABSTRACT

The problem of developing and evaluating a personalized, competency-based modular instructional strategy was chosen to offer an alternative to the traditional lecture method in a laboratory food and nutrition course at the university level. The content of the course was divided into modules with competency-based objectives. Students passing the pretest for a particular module were exempt from taking that module. When the competencies associated with a module had been achieved, students requested the module posttest. There were 109 students in the modular instruction group and a control group of 64 students studied under the traditional lecture method. Cognitive test scores for students using modular instruction were higher, but not significantly. Psychomotor scores for the modular group were significantly higher. Student reactions to the modular program were positive and several were able to complete the course in less than the required 15 weeks. (Author/JAB)

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MODULAR INSTRUCTION - AN ALTERNATIVE STRATEGY IN HIGHER EDUCATION

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MODULAR INSTRUCTION - AN ALTERNATIVE
STRATEGY IN HIGHER EDUCATION

8th INTERNATIONAL CONGRESS OF
INDIVIDUALIZED INSTRUCTION
November 18, 1976
Boston, Massachusetts
by Angela Boren
Sherrell Foree

The problem of developing and evaluating a personalized, competency-based modular instructional strategy was chosen specifically to offer an alternative to the traditional teacher-directed, lecture method in a laboratory food and nutrition course at the university level.

The modular instructional strategy was chosen as the experimental model in this study because it relies heavily upon competency-based objectives. The strategy offers individualization so that progress is at the student's best or most convenient rate of learning, as well as, being able to enter the program at any point depending upon previous knowledge or experience. Through a variety of print and visual learning experiences, the student has the opportunity to choose the media best suited to his/her mode of learning. The modular strategy, additionally, offers students the opportunity for more personal interaction with teachers and peers.

Specific objectives of the study were to:

1.) Develop a model for personalized, competency-based instructional strategy.

2.) Develop evaluation instruments to measure achievement of objectives in the cognitive and psychomotor domains.

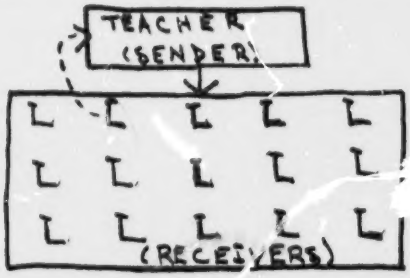
3.) Evaluate the effectiveness of the individualized modular instructional strategy compared with a teacher-directed strategy.

4.) Determine student reaction to the modular strategy of instruction.

For the purposes of this study, the traditional teacher-directed instructional strategy was considered to be the lecture method. It centers on the teacher as the sender of the educational message and the learner as the receiver

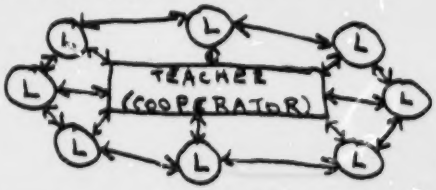
of the message with limited interaction between teacher and learner. (Figure 1).

FIGURE 1. TEACHER-DIRECTED INSTRUCTIONAL STRATEGY



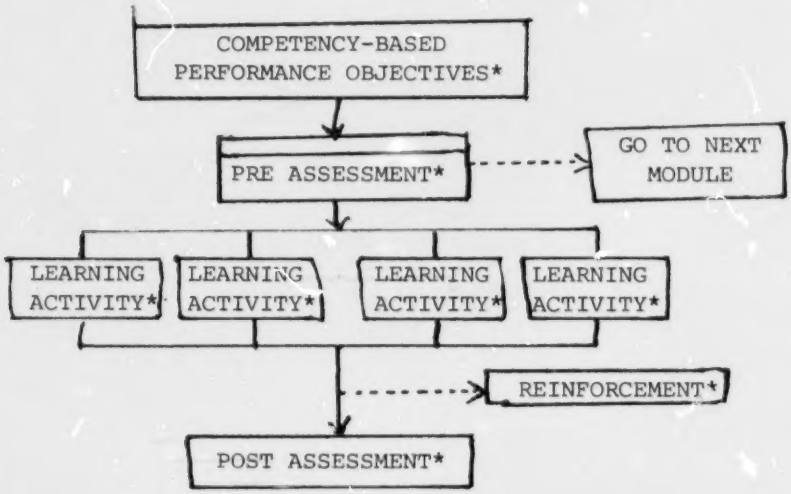
The modular strategy, the experimental strategy in this study, is an individualized approach featuring the learners and teacher as cooperators in the learning process. Figure 2 illustrates the way in which learners interact freely with and learn from other learners and teacher.

FIGURE 2. MODULAR INSTRUCTIONAL STRATEGY



The conceptual model of the modular instructional strategy is depicted in Figure 3. The subject matter of the course was divided into modules. Competency-based objectives were established for each module. The model reveals the concept of preassessment founded upon objectives to determine the entry level of each student. Preassessment was in the form of a objective pretest and a simple meal at the first of the semester. In this study, a score of 80% on cognitive tests and/or 90% on psychomotor skills allowed a student to exempt a module or meal experiences. If a student lacked the background knowledge and/or experience to exempt a module, various learning experiences and reinforcement experiences were available and keyed to specific objectives. Each student determined when the competencies had been achieved and requested the posttest for the module on a individual basis.

FIGURE 3. MODULAR INSTRUCTIONAL STRATEGY



*FACULTY INPUT AT EVERY STAGE

All course materials were "in-hand" in the form of a syllabus that students used independently and at their own convenience. Modules were color keyed and each included these components: Title, Rationale, Competencies, Performance Objectives, Learning Experiences, Evaluation. The Rationale indicated to the student the reasons for importance of the material to be covered. From the teacher's standpoint the writing of a rationale served as a check to determine if material was superfluous or outdated. If a good reason could not be established for a topic it was deleted from the course. This helps to modernize curricula.

Competencies were stated in broad terms for a module or lessons within a module followed by objectives written so that students knew exactly what was required and how to prove competence.

Students were cued to specific learning experiences for each objective by a number code. Evaluation or postassessment was in the form of written projects and objective tests to determine competence in cognitive objectives. Laboratory experiences and meals tested psychomotor objectives.

One hundred seventy-three students in a laboratory food and nutrition course were exposed to either the traditional, teacher-directed classroom mode or the modular strategy of instruction; 64 students in the traditional group and 109 in the module group. Data collected for analysis were demographic information, test scores and responses to open-ended ratings on psychomotor skills. Analysis of variance was by the method of least squares for unequal subclasses (Harvey, 1960). Duncan's New Multiple Range Test (Steel and Torrie) was used to test differences between means when significance was found between values. A majority of subjects were classified as sophomores or juniors, majoring predominately in home economics education or food and nutrition. More single than married students and more females than males comprised the sample. Analysis of variance indicated no difference between groups (control or experimental) for classification, major, marital status, or sex variables.

Table 1 shows the results of module test scores and mean gains. Analysis of variance indicated no difference (P .05) in pretest, posttest and mean gain scores between groups. All students had similar starting achievement levels, module post-test scores and mean gain scores. Results indicate that criterion test scores, evaluating cognitive objectives were similar. Although the achievement was a bit higher for the modular group, it was not significant.

TABLE 1. LEAST SQUARES MEANS AND STANDARD ERRORS FOR PRETEST, POSTTEST AND MEAN GAIN SCORES FOR COGNITIVE OBJECTIVES.
(POSSIBLE SCORE = 78)

Group	N	Pretest		Posttest		Gain Score	
		Mean	SE	Mean	SE	Mean	SE
Control	64	49.5	1.02	63.5	0.89	14.1	0.86
Experimental	109	46.6	0.78	62.5	0.68	15.9	0.65

Table 2 lists least squares means for the projects and psychomotor competencies for both groups. Analysis of variance of the scores obtained for two projects and three meals indicated that the students in the modular groups had significantly (P .05) greater mastery levels or scores than the traditional groups.

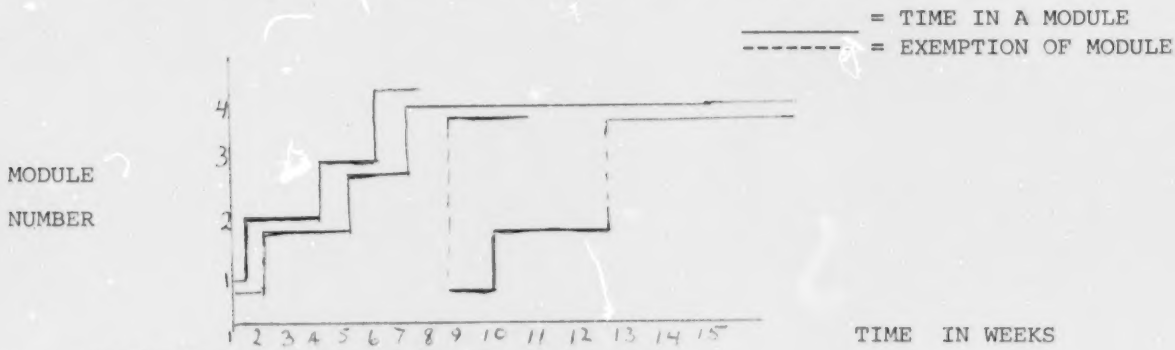
TABLE 2. LEAST SQUARES FOR PROJECTS AND PSYCHOMOTOR COMPETENCIES
(POSSIBLE SCORE = 100)

GROUP	PROJECT 1 MEAN	PROJECT 2 MEAN	MEAL 1 MEAN	MEAL 2 MEAN	MEAL 3 MEAN
TRADITIONAL	86.6[a]	84.5[a]	64.8[a]	85.2[a]	84.8[a]
MODULAR	88.9[b]	89.3[b]	74.6[b]	88.2[b]	90.2[b]

[a,b] Means in a column with different superscripts differ significantly (P .05).

Figure 4 shows the variety of time spent by 4 sample students in the modular groups. Whereas the traditional groups worked at specified rates directed by the teacher and spent the full 15 week period, many students in the modular groups chose to complete the course in less than the usual semester. Five students were able to complete requirements in 7 weeks. This was the case with student A who began week one, completed each module in turn and finished the 7th week. Student B began the course the 8th week, exempted two modules and completed the course in three weeks. Student C began the 10th week exempted one module and completed in 5 weeks. Another pattern in shown in which student D started the first week, worked quickly through the first three modules and took the rest of the semester to finish. This may have been as a result of heavy pressures in other classes at the end of the semester, illness or any number of other reasons. About half the students in the modular group finished the course in less than the full 15 weeks of the semester.

FIGURE 4. LEARNING RATES OF STUDENTS IN THE MODULAR GROUPS



Conclusions of this study are:

1) Results indicated students learn by either strategy.

2) Cognitive test scores were higher for students using the modular strategy but not significantly higher.

3) Psychomotor scores were significantly higher for students using the modular strategy.

4) Student reactions to the modular strategy were positive.

The most rewarding aspect of the study was the response of students to a new approach to teaching at the University level. When asked to respond to open-

. . . . ended statements on course evaluations, students overwhelming endorsed the new method. When clustered, the four most common responses were that students enjoyed the modular strategy because of:

self-pacing and wished more courses were taught by this method,

also, because of the informality inherent in modular instruction,

the availability of individual help,

the variety of learning experiences.

Other responses which appeared often were such as:

I was motivated and developed the responsibility to learn on my own.

I felt the freedom to ask for individual help when I needed it.

Knowledge gained through learning experiences was applied and practiced in projects and laboratory.

I appreciated being able to exempt modules dealing with competencies I had acquired on my own. The statement that I as a teacher appreciated the most was "Always before I have been trained to be taught, now I can learn."

Some negative responses revealed an uneasiness on the part of some students in regard to individualized approach since it was unfamiliar to them and some had a tendency to procrastinate due to lack of self discipline.

In summary, a modular instructional strategy was applied in teaching a university food and nutrition course and compared with the traditional teacher-directed lecture approach. Analysis of variance indicated the two strategies were comparable when competencies in the cognitive domain were evaluated. Modular groups scored significantly higher than traditional groups (P .05) on psychomotor competencies and in application situations. The modular strategy was well received by students and will be continued in the future at Texas Tech University.